

Petro Operating Company

Location Weld County, CO Slot BEF West 18
Field Wattenberg Well W BEF West 18
Installation Brighton East Farm Pad Wellbore W BEF West 18 (PWB)

Tie on - 0.00 Inc, 21.00 MD, 21.00 TVD, 0.00 VS

Scale 1 cm = 400 ft

East (Feet) ->

-5600 -4800 -4000 -3200 -2400 -1600 -800 -0 800 1600

BEF WEST 18 BHL

BEF WEST 18 EP

Surface 0.00 N 0.00 E

3DS Kick off Point - 0.00 Inc, 1500.00 MD, 1500.00 TVD, 0.00 VS

End of Build - 8.58 Inc, 1857.53 MD, 1856.20 TVD, -2.86 VS

WELL PROFILE DATA

Point	MD	Inc	Azi	TVD	North	East	deg/100ft	V. Sect
Tie on	21.00	0.00	0.00	21.00	S 0.00	W 0.00		0.00
KOP	1500.00	0.00	16.30	1500.00	S 0.00	W 0.00	0.00	0.00
End of Build	1857.53	8.58	16.30	1856.20	N 25.65	E 7.50	2.40	-2.86
End of Hold	7216.14	8.58	16.30	7154.82	N 793.03	E 231.93	0.00	-88.58
Target BEF WEST 18 EP	7986.97	90.00	269.30	7648.00	N 858.40	W 245.91	12.00	393.31
T.D. & Target BEF...BHL	12248.12	90.00	269.30	7648.00	N 806.69	W 4506.75	0.00	4578.38

N
GRID

Oct-2017
EMMA-2015 (2000.0-2020.0) DTM: 48.38 deg Field: 52108.9 nT
Lat: N39 59 33.9000 Long: W104 44.4 8840 Elev: 5047.00 ft
Magnetic North is 8.22 deg East of True North
GRID North is 0.49 deg East of True North
To correct azimuth from True to GRID subtract 0.49 deg
To correct azimuth from Magnetic to GRID add 7.72 deg

Created by admin
Date plotted 21-Feb-2018

Plot reference is W BEF West 18 (PWB).
Ref wellpath is W BEF West 18 (PWP#1).
Coordinates are in Feet reference BEF West 18.
True Vertical Depths are reference Rig Datum.
Measured Depths are reference Rig Datum.
Rig Datum: Planned Datum #1
Rig Datum to Mean Sea Level: 5068.00 ft.
Plot North is aligned to GRID North.

End of Hold - 8.58 Inc, 7216.14 MD, 7154.82 TVD, -88.58 VS

S/C Kick off Point - 90.00 Inc, 7986.97 MD, 7648.00 TVD, 393.31 VS

T.D. & End of Hold - 7648.00 TVD, 806.69 N 4506.75 W

BEF WEST 18 EP

BEF WEST 18 BHL

W BEF West 18 (PWB)

Scale 1 cm = 200 ft
Vertical Section (Feet) ->

Azimuth 280.15 with reference 0.00 N, 0.00 E from BEF West 18



SYSDRILL
Well Design Combined Report
Wellbore: W BEF West 18 (PWB)



Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
BEF West 18	39.99476000	-104.73470000	1241863.2867	3214415.3550	732.16N	9.12W	0.00

Declination

Date	Source	Time
Oct-6-2017	EMM-2015 [2000.0-2020.0]	14:35

Installation Details

Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Brighton East Farm Pad	39.99275000	-104.73469000	1241131.1481	3214424.4758	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Summary Wellpath

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	Vertical Depth SS	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]
21.00	0.00	0.000	21.00	-5047.00	0.00N	0.00E		0.00
1500.00	0.00	16.300	1500.00	-3568.00	0.00N	0.00E	==>	0.00
1857.53	8.58	16.300	1856.20	-3211.80	25.65N	7.50E	2.40	-2.86
7216.14	8.58	16.300	7154.82	2086.82	793.03N	231.93E	==>	-88.58
7986.97	90.00	269.300	7648.00	2580.00	858.40N	245.91W	12.00	393.31
12248.12	90.00	269.300	7648.00	2580.00	806.69N	4506.75W	==>	4578.38

Interpolated Wellpath

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Station Position (Latitude)	Station Position (Longitude)
0.00	0.00	0.000	0.00	0.00N	0.00E		0.00	39.99476000	-104.73470000
21.00	0.00	0.000	21.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1400.00	0.00	0.000	1400.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1500.00	0.00	16.300	1500.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1600.00	2.40	16.300	1599.97	2.01N	0.59E	2.40	-0.22	39.99476550	-104.73469784
1700.00	4.80	16.300	1699.77	8.04N	2.35E	2.40	-0.90	39.99478200	-104.73469136
1800.00	7.20	16.300	1799.21	18.07N	5.28E	2.40	-2.02	39.99480947	-104.73468058
1900.00	8.58	16.300	1898.19	31.73N	9.28E	==>	-3.54	39.99484688	-104.73466590
2000.00	8.58	16.300	1997.07	46.05N	13.47E	==>	-5.14	39.99488609	-104.73465051
2100.00	8.58	16.300	2095.95	60.37N	17.66E	==>	-6.74	39.99492530	-104.73463513
2200.00	8.58	16.300	2194.83	74.69N	21.84E	==>	-8.34	39.99496451	-104.73461974
2300.00	8.58	16.300	2293.71	89.01N	26.03E	==>	-9.94	39.99500372	-104.73460435
2400.00	8.58	16.300	2392.59	103.33N	30.22E	==>	-11.54	39.99504293	-104.73458896
2500.00	8.58	16.300	2491.47	117.65N	34.41E	==>	-13.14	39.99508214	-104.73457357
2600.00	8.58	16.300	2590.35	131.97N	38.60E	==>	-14.74	39.99512135	-104.73455818
2700.00	8.58	16.300	2689.23	146.29N	42.79E	==>	-16.34	39.99516056	-104.73454279
2800.00	8.58	16.300	2788.12	160.61N	46.97E	==>	-17.94	39.99519977	-104.73452740
2900.00	8.58	16.300	2887.00	174.94N	51.16E	==>	-19.54	39.99523898	-104.73451202
3000.00	8.58	16.300	2985.88	189.26N	55.35E	==>	-21.14	39.99527819	-104.73449663
3100.00	8.58	16.300	3084.76	203.58N	59.54E	==>	-22.74	39.99531740	-104.73448124
3200.00	8.58	16.300	3183.64	217.90N	63.73E	==>	-24.34	39.99535662	-104.73446585

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5068.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 280.150 degrees
Bottom hole distance is 4578.38 Feet on azimuth 280.15 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 21-Feb-2018

Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Station Position (Latitude)	Station Position (Longitude)
3300.00	8.58	16.300	3282.52	232.22N	67.92E	==>	-25.94	39.99539583	-104.73445046
3400.00	8.58	16.300	3381.40	246.54N	72.10E	==>	-27.54	39.99543504	-104.73443507
3500.00	8.58	16.300	3480.28	260.86N	76.29E	==>	-29.14	39.99547425	-104.73441968
3600.00	8.58	16.300	3579.16	275.18N	80.48E	==>	-30.74	39.99551346	-104.73440429
3700.00	8.58	16.300	3678.04	289.50N	84.67E	==>	-32.33	39.99555267	-104.73438890
3800.00	8.58	16.300	3776.92	303.82N	88.86E	==>	-33.93	39.99559188	-104.73437352
3900.00	8.58	16.300	3875.80	318.14N	93.04E	==>	-35.53	39.99563109	-104.73435813
4000.00	8.58	16.300	3974.68	332.46N	97.23E	==>	-37.13	39.99567030	-104.73434274
4100.00	8.58	16.300	4073.56	346.78N	101.42E	==>	-38.73	39.99570951	-104.73432735
4200.00	8.58	16.300	4172.44	361.10N	105.61E	==>	-40.33	39.99574872	-104.73431196
4300.00	8.58	16.300	4271.32	375.42N	109.80E	==>	-41.93	39.99578793	-104.73429657
4400.00	8.58	16.300	4370.21	389.74N	113.99E	==>	-43.53	39.99582714	-104.73428118
4500.00	8.58	16.300	4469.09	404.06N	118.17E	==>	-45.13	39.99586635	-104.73426579
4600.00	8.58	16.300	4567.97	418.39N	122.36E	==>	-46.73	39.99590556	-104.73425040
4700.00	8.58	16.300	4666.85	432.71N	126.55E	==>	-48.33	39.99594477	-104.73423501
4800.00	8.58	16.300	4765.73	447.03N	130.74E	==>	-49.93	39.99598398	-104.73421962
4900.00	8.58	16.300	4864.61	461.35N	134.93E	==>	-51.53	39.99602319	-104.73420423
5000.00	8.58	16.300	4963.49	475.67N	139.12E	==>	-53.13	39.99606240	-104.73418885
5100.00	8.58	16.300	5062.37	489.99N	143.30E	==>	-54.73	39.99610162	-104.73417346
5200.00	8.58	16.300	5161.25	504.31N	147.49E	==>	-56.33	39.99614083	-104.73415807
5300.00	8.58	16.300	5260.13	518.63N	151.68E	==>	-57.93	39.99618004	-104.73414268
5400.00	8.58	16.300	5359.01	532.95N	155.87E	==>	-59.53	39.99621925	-104.73412729
5500.00	8.58	16.300	5457.89	547.27N	160.06E	==>	-61.13	39.99625846	-104.73411190
5600.00	8.58	16.300	5556.77	561.59N	164.24E	==>	-62.73	39.99629767	-104.73409651
5700.00	8.58	16.300	5655.65	575.91N	168.43E	==>	-64.32	39.99633688	-104.73408112
5800.00	8.58	16.300	5754.53	590.23N	172.62E	==>	-65.92	39.99637609	-104.73406573
5900.00	8.58	16.300	5853.42	604.55N	176.81E	==>	-67.52	39.99641530	-104.73405034
6000.00	8.58	16.300	5952.30	618.87N	181.00E	==>	-69.12	39.99645451	-104.73403495
6100.00	8.58	16.300	6051.18	633.19N	185.19E	==>	-70.72	39.99649372	-104.73401956
6200.00	8.58	16.300	6150.06	647.51N	189.37E	==>	-72.32	39.99653293	-104.73400417
6300.00	8.58	16.300	6248.94	661.83N	193.56E	==>	-73.92	39.99657214	-104.73398878
6400.00	8.58	16.300	6347.82	676.16N	197.75E	==>	-75.52	39.99661135	-104.73397339
6500.00	8.58	16.300	6446.70	690.48N	201.94E	==>	-77.12	39.99665056	-104.73395800
6600.00	8.58	16.300	6545.58	704.80N	206.13E	==>	-78.72	39.99668977	-104.73394262
6700.00	8.58	16.300	6644.46	719.12N	210.32E	==>	-80.32	39.99672898	-104.73392723
6800.00	8.58	16.300	6743.34	733.44N	214.50E	==>	-81.92	39.99676819	-104.73391184
6900.00	8.58	16.300	6842.22	747.76N	218.69E	==>	-83.52	39.99680740	-104.73389645
7000.00	8.58	16.300	6941.10	762.08N	222.88E	==>	-85.12	39.99684661	-104.73388106
7100.00	8.58	16.300	7039.98	776.40N	227.07E	==>	-86.72	39.99688583	-104.73386567
7200.00	8.58	16.300	7138.86	790.72N	231.26E	==>	-88.32	39.99692504	-104.73385028
7300.00	11.15	316.390	7237.64	804.94N	228.09E	12.00	-82.69	39.99696413	-104.73386115
7400.00	21.15	291.200	7333.67	818.51N	204.51E	12.00	-57.09	39.99700195	-104.73394488
7500.00	32.51	282.390	7422.80	830.85N	161.28E	12.00	-12.37	39.99703684	-104.73409877
7600.00	44.18	277.840	7501.11	841.41N	100.30E	12.00	49.52	39.99706728	-104.73431611
7700.00	55.97	274.900	7565.19	849.73N	24.22E	12.00	125.88	39.99709193	-104.73458739
7800.00	67.81	272.680	7612.23	855.45N	63.63W	12.00	213.36	39.99710972	-104.73490076
7900.00	79.67	270.810	7640.18	858.32N	159.41W	12.00	308.15	39.99711987	-104.73524251
8000.00	90.00	269.300	7648.00	858.25N	258.94W	==>	406.11	39.99712200	-104.73559773
8100.00	90.00	269.300	7648.00	857.03N	358.93W	==>	504.32	39.99712104	-104.73595465
8200.00	90.00	269.300	7648.00	855.82N	458.92W	==>	602.54	39.99712007	-104.73631157
8300.00	90.00	269.300	7648.00	854.60N	558.92W	==>	700.75	39.99711910	-104.73666848
8400.00	90.00	269.300	7648.00	853.39N	658.91W	==>	798.96	39.99711813	-104.73702540
8500.00	90.00	269.300	7648.00	852.18N	758.90W	==>	897.18	39.99711716	-104.73738232
8600.00	90.00	269.300	7648.00	850.96N	858.89W	==>	995.39	39.99711619	-104.73773923
8700.00	90.00	269.300	7648.00	849.75N	958.89W	==>	1093.61	39.99711522	-104.73809615
8800.00	90.00	269.300	7648.00	848.54N	1058.88W	==>	1191.82	39.99711425	-104.73845307
8900.00	90.00	269.300	7648.00	847.32N	1158.87W	==>	1290.04	39.99711327	-104.73880999
9000.00	90.00	269.300	7648.00	846.11N	1258.86W	==>	1388.25	39.99711230	-104.73916690

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5068.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 280.150 degrees
Bottom hole distance is 4578.38 Feet on azimuth 280.15 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 21-Feb-2018



SYSDRILL
Well Design Combined Report
Wellbore: W BEF West 18 (PWB)



Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Station Position (Latitude)	Station Position (Longitude)
9100.00	90.00	269.300	7648.00	844.89N	1358.86W	==>	1486.46	39.99711132	-104.73952382
9200.00	90.00	269.300	7648.00	843.68N	1458.85W	==>	1584.68	39.99711034	-104.73988074
9300.00	90.00	269.300	7648.00	842.47N	1558.84W	==>	1682.89	39.99710936	-104.74023765
9400.00	90.00	269.300	7648.00	841.25N	1658.84W	==>	1781.11	39.99710838	-104.74059457
9500.00	90.00	269.300	7648.00	840.04N	1758.83W	==>	1879.32	39.99710740	-104.74095149
9600.00	90.00	269.300	7648.00	838.83N	1858.82W	==>	1977.54	39.99710642	-104.74130840
9700.00	90.00	269.300	7648.00	837.61N	1958.81W	==>	2075.75	39.99710543	-104.74166532
9800.00	90.00	269.300	7648.00	836.40N	2058.81W	==>	2173.97	39.99710445	-104.74202224
9900.00	90.00	269.300	7648.00	835.19N	2158.80W	==>	2272.18	39.99710346	-104.74237916
10000.00	90.00	269.300	7648.00	833.97N	2258.79W	==>	2370.39	39.99710248	-104.74273607
10100.00	90.00	269.300	7648.00	832.76N	2358.78W	==>	2468.61	39.99710149	-104.74309299
10200.00	90.00	269.300	7648.00	831.54N	2458.78W	==>	2566.82	39.99710050	-104.74344991
10300.00	90.00	269.300	7648.00	830.33N	2558.77W	==>	2665.04	39.99709951	-104.74380682
10400.00	90.00	269.300	7648.00	829.12N	2658.76W	==>	2763.25	39.99709852	-104.74416374
10500.00	90.00	269.300	7648.00	827.90N	2758.75W	==>	2861.47	39.99709753	-104.74452066
10600.00	90.00	269.300	7648.00	826.69N	2858.75W	==>	2959.68	39.99709653	-104.74487757
10700.00	90.00	269.300	7648.00	825.48N	2958.74W	==>	3057.90	39.99709554	-104.74523449
10800.00	90.00	269.300	7648.00	824.26N	3058.73W	==>	3156.11	39.99709454	-104.74559141
10900.00	90.00	269.300	7648.00	823.05N	3158.72W	==>	3254.32	39.99709355	-104.74594833
11000.00	90.00	269.300	7648.00	821.84N	3258.72W	==>	3352.54	39.99709255	-104.74630524
11100.00	90.00	269.300	7648.00	820.62N	3358.71W	==>	3450.75	39.99709155	-104.74666216
11200.00	90.00	269.300	7648.00	819.41N	3458.70W	==>	3548.97	39.99709055	-104.74701908
11300.00	90.00	269.300	7648.00	818.19N	3558.70W	==>	3647.18	39.99708955	-104.74737599
11400.00	90.00	269.300	7648.00	816.98N	3658.69W	==>	3745.40	39.99708855	-104.74773291
11500.00	90.00	269.300	7648.00	815.77N	3758.68W	==>	3843.61	39.99708754	-104.74808983
11600.00	90.00	269.300	7648.00	814.55N	3858.67W	==>	3941.83	39.99708654	-104.74844674
11700.00	90.00	269.300	7648.00	813.34N	3958.67W	==>	4040.04	39.99708553	-104.74880366
11800.00	90.00	269.300	7648.00	812.13N	4058.66W	==>	4138.25	39.99708453	-104.74916058
11900.00	90.00	269.300	7648.00	810.91N	4158.65W	==>	4236.47	39.99708352	-104.74951749
12000.00	90.00	269.300	7648.00	809.70N	4258.64W	==>	4334.68	39.99708251	-104.74987441
12100.00	90.00	269.300	7648.00	808.49N	4358.64W	==>	4432.90	39.99708150	-104.75023133
12200.00	90.00	269.300	7648.00	807.27N	4458.63W	==>	4531.11	39.99708049	-104.75058824
12248.12	90.00	269.300	7648.00	806.69N	4506.75W	==>	4578.38	39.99708000	-104.75076000

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5068.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 280.150 degrees
Bottom hole distance is 4578.38 Feet on azimuth 280.15 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 21-Feb-2018



SYS DRILL
Well Design Combined Report
Wellbore: W BEF West 18 (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
BEF WEST 18 BHL	806.69N	4506.75W	7648.00	39.99708000	-104.75076000	1242669.95	3209908.77
BEF WEST 18 EP	858.40N	155.91W	7648.00	39.99712000	-104.73523000	1242721.66	3214259.45

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
577675	Planned	2000.00	1997.07	WdW Rate Gyro	Standard	
577674	Planned	12248.12	7648.00	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes